JST Activities towards Low Carbon Society (Japan Science and Technology Agency)

International Challenge for Promoting Green Innovation to Realize a Low Carbon Society Worldwide

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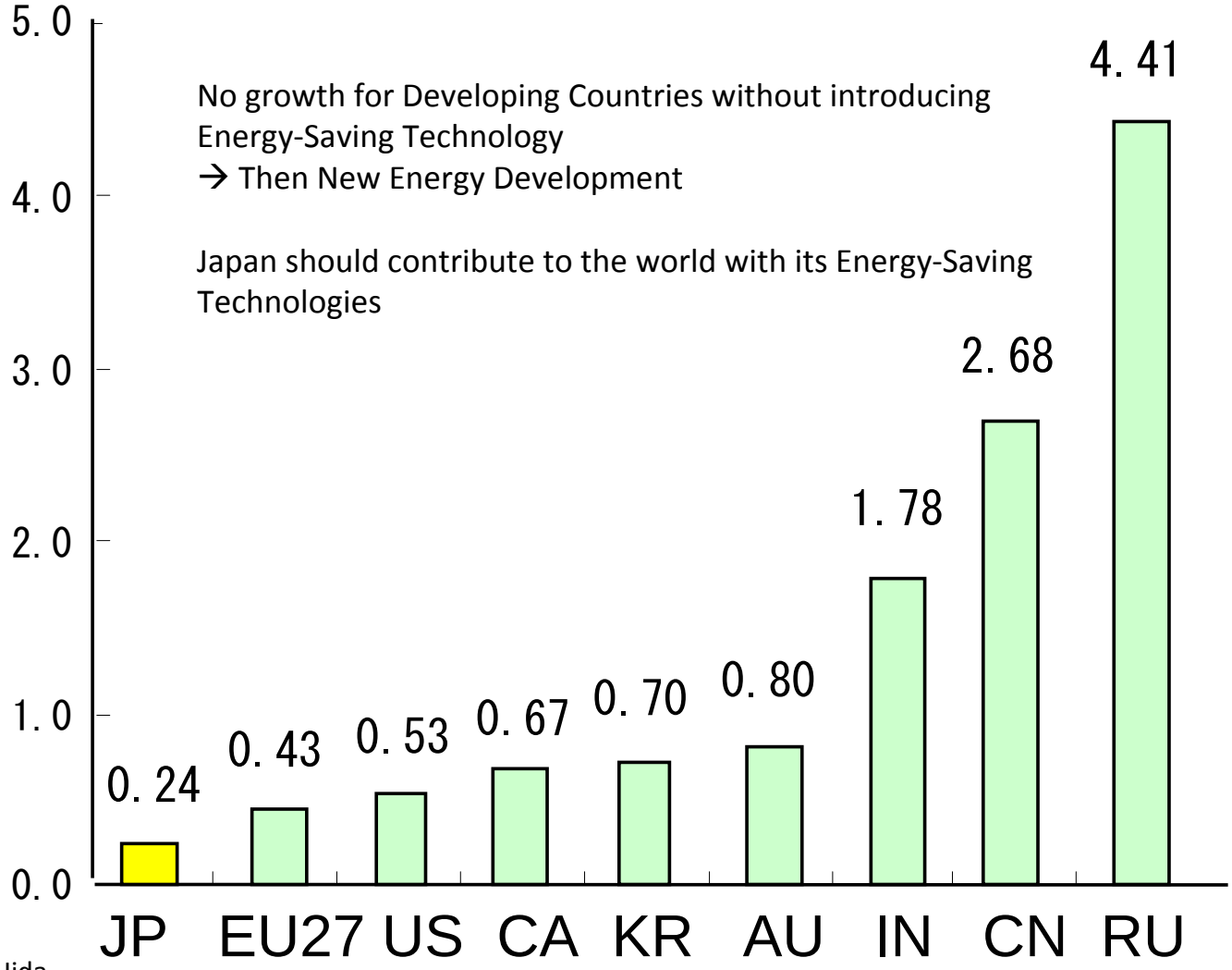
Japan Science & Technology Agency (JST)

Contents

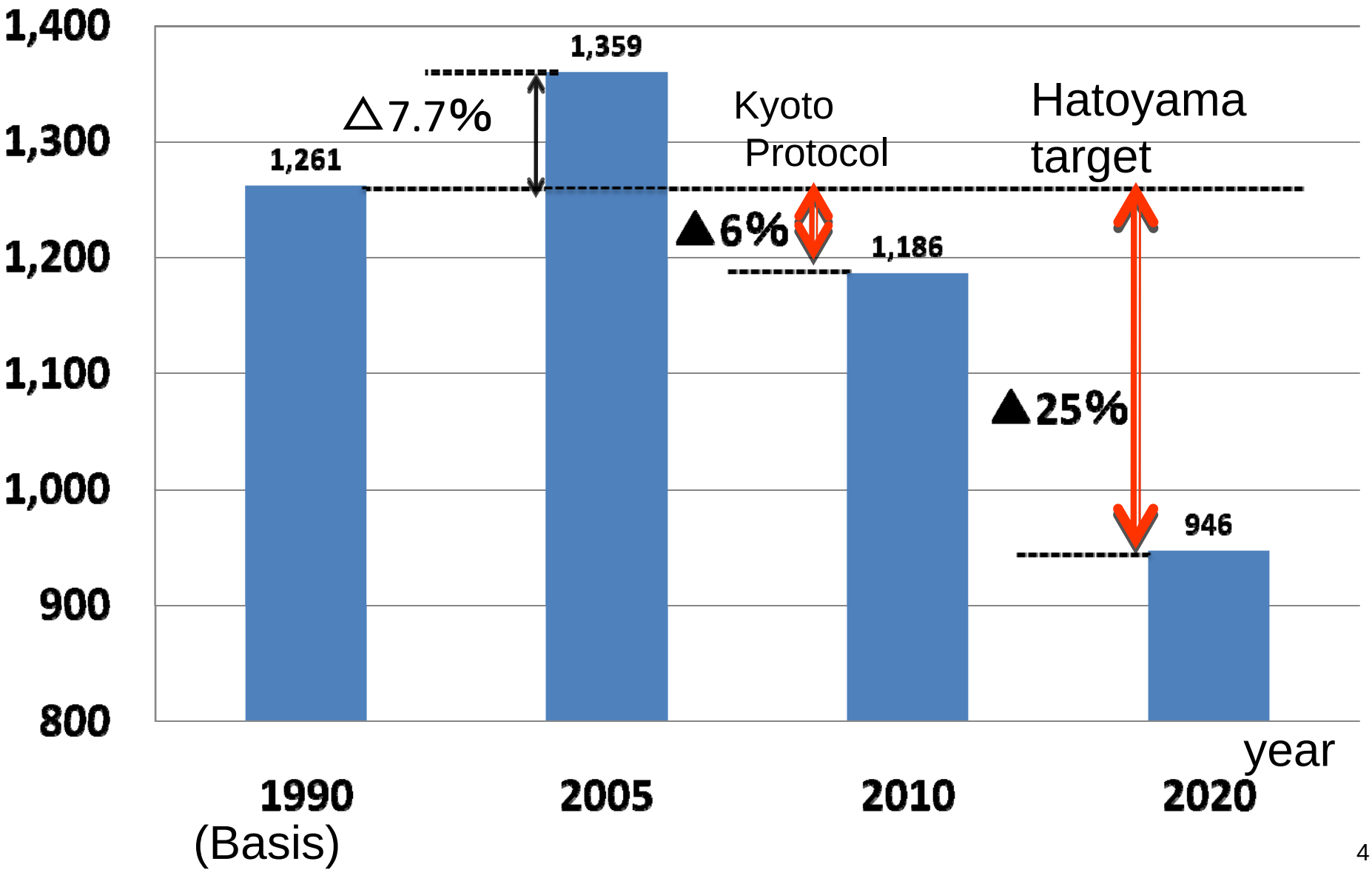
CO2 Emission per GDP (As of 2005)

[KgCO2/US$ (Central Currency Exchange Rate of 2000)]



Data by Dr.Tetsunari Iida, Institute for Sustainable Energy Policies (ISEP)

CO2 Reduction Target of Japan



CO2 Reduction from Daily Life (1990 basis) 1/2

			Reduction rate
Daily Life	Residence/ Office	PV(80% of new houses) High efficiency electrical appliances (100%) Insulation Smart Energy Management System (100%) Removal of old house by compact city (4%)	6%
	Transportation	Hybrid car (20%) Energy saving car (30%) Modal shift	6%
	Agriculture	・Treatment of plant disease ・Reduction of fertilization ・CO2 fixation	2%

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CO2 Reduction from Daily Life (1990 basis) 2/2

		Reduction rate
Electricity	・Nuclear power (6%, operating rate → 90%) ・High eff. power plant ・Coal –biomass mixed fuel (50%) ・Wind ・Geothermal ・Higher voltage (1w → 2W/400V)	5%
Industry	Annual reduction rate of 1%/y	3%
Forest	Regeneration	3%

New CDM α

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Total 25% + α

Reduction : 410 Mt-CO2/y

Strategic Scheme for Green Innovation by MEXT

Social System Transformation for Low Carbon Society

Low Carbon Society R&D Strategy Bureau

Control overall strategy
（Prioritize R&D Items ）

Consulting

Low Carbon Society R&D Strategy Promotion Committee

Mitigation Tech. Diffusion to Society

Realization of Climate Change Adaptation Society

Linkage to Related Ministries, Agencies, Local Governments,

Field Experiment Strategy

○Field experimental research of Low Carbon Technology

Mitigation Strategy

◆ Society system reform program toward new society corresponding to climate change
5Million Yen(New)

Adaptation Strategy

Diplomatic Strategy

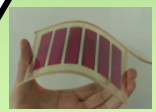
Int'l Cooperation・S&T Diplomacy

○Contribute to UNFCCC /IPCC/GEOSS etc
○Support to Developing Countries、Capacity Bldg

Apply collective R&D efforts from Univ., Agencies, Institutes

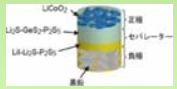
Innovative technology contributing to Greenhouse Gases Reduction

◆Advanced Low Carbon Related Technologies etc
5,809Million Yen（1,339Million Yen）



High-performance sensitizedsolar cell

Superconducting power transmission cable



Next-generation high-performance storage cell

Super high-temperature resistant alloys

○Promote R & D of Near & Long Term Energy Technology

Utilize full results of ***Basic Research Strategy***（JST's CREST etc）

Research for adaptation of environmental change caused by global warming

◆Climate Change Adaptation Strategy Initiative etc
3,158Million Yen（2,316Million Yen）

○Promote Climate Change Projection and Data Integration as common platform technology

Earth Simulator

Data Integration & Analysis Systemy(DIAS)

Apply full results of ***EO Strategy***

○Research analysis on realization of new technology

General Strategy

◆Social Scenario Research for Low Carbon Society
300Million Yen（New）

◇JST Low Carbon Social Strategy Center Establishment

○Research Analysis on possibilities of adoption and diffusion of technology considering utility to public and lifestyle change

○Research analysis on influence of new technology to society

Mitigation Technology
Adaptation Technology

JST's Activities related to Green Innovation

Programs specialized in environmental/energy fields
Programs related to other fields

Programs specialized in environmental/energy fields

Strategic Planning

CRDS: Research Strategic Planning in the environmental/energy related fields

LCS: Social Scenario Research for Low Carbon Society

CRDS: Center for Research and Development Strategy
LCS: Center for Low Carbon Society Strategy

Creating Advanced technology (domestic)

Advanced Low Carbon Technology Research

RISTEX: Community-Based actions against global Warming and Environmental Degradation

Basic Research Programs (Environment/Energy)

Special Coordination Funds for Promoting S&T: Social System Reformation Program to Create New Societies to Respond on Climate Change

International research cooperation (international)

Science and Technology Research Partnership for Sustainable Development (SATREPS) (Fields of Environment/Energy)

Programs related to other fields

Creating Advanced technology (domestic)

Promotion to generate strategic innovations

RISTEX:"vivid super-aged society"

RISTEX: Research Institute of Science and Technology for Society

Collaborative research based on industrial demand

International research cooperation (international)

Strategic International Cooperative Program- Research Exchange Type (SICP)

Strategic International Cooperative Program (SICP)- Joint Research Type

Main goals of projects

Discovering Technology Needs → Fostering Technology Needs → Implementation・Dissemination

JST's Initiative to Realize a Low Carbon Society

【】Budget for FY2010（million JPY）

- Low Carbon Society R&D Strategy＜New＞
  - ✓ Center for Low Carbon Society Strategy 【 300M 】
  - ✓ Advanced Low Carbon Technology Research 【 2,500M 】
- Basic Research Programs ＜ Expanding ＞ 【 5,036M】
- Industrial-Academia Collaborative R&D Programs ＜New＞ 【 150M】
  - ✓ Promotion to generate strategic innovations
  - ✓ Collaborative research based on industrial demand
- Research programs of Science and Technology for Society ＜Expanding＞ 【 314M】
- Strategic International Cooperative Program (SICP)
  - ✓ Research Exchange Type ＜Expanding＞ 【 350M】
  - ✓ Joint Research Type ＜New＞ 【 20M】
- Science and Technology Research Partnership for Sustainable Development (SATREPS) ＜Expanding＞ 【 1,112M】

【Total：9,782M】

Center for Low Carbon Society Strategy (LCS): JST

Founded Dec, 2009
in JST (Japan Science and Technology Agency)

Director-General:
Hiroshi Komiyama
the Former President
of University of Tokyo

Reduce CO2 emission by efforts in "Daily Life" !

Describe "Low Carbon Society" in 2020/2050 and
Make scenarios of the rout to LCS.

Prevent "Global warming"

Current Society in 2010

Low Carbon Society by 2020

Low Carbon Society by 2050

Reduction by 25% by 2020 from 1990 levels

Reduction Target of 80% by 2050 from 1990 levels

Starting fund: 3M$

Propose Comprehensive Strategy, Formulate Scenarios, and Establish the Model for Achieving a Low Carbon Society

Appendix

Excerpt from New Growth Strategy (basic policy) of Japanese Government (Cabinet approved in December 2009)

Growth Driven by Japan's Strengths

(1) Strategy for becoming an environment and energy power through "green innovation"

[Targets to reach by 2020]

•Create over ¥50 trillion new environment-related market and 1.4 million new environment sector jobs.

•Utilizing our private-sector technology, contribute to reduce worldwide GHG emissions by at least 1.3 billion tons of CO2 equivalent (equivalent to the total emissions of Japan).

[Principal measures]

• Spread renewable energy by expanding electric power feed-in tariffs, etc.

• Turn homes, offices, etc. into zero-emission structures through the spread of eco-housing, heat pumps, etc.

• Speed development of innovative technologies including storage batteries, next-generation automobiles, and improved thermal power plant efficiency.

• Implement intensive investment project for realizing a low-carbon society via a comprehensive policy package including regulatory reforms and the greening of the tax system.

Excerpt from New Growth Strategy (basic policy) (Cabinet approved in December 2009) -continued-

Platforms to Support Growth

(5) Science-and-technology-oriented nation strategy

[Targets to reach by 2020]

- Lead the world in “green innovation” and “life innovation.”
- Increase the number of universities and research institutions that lead the world in respective fields
- Ensure full employment for all those who have completed doctoral courses in science and technology.
- Encourage utilization of intellectual property possessed by small and medium-sized enterprises
- Improve the convenience of daily life and lower production costs through the use of information and communications technology
- Increase public- and private-sector investment in research and development to over 4% of GDP

[Principal measures]

- Speed up reforms to universities and public research institutions and provide diverse career paths for young researchers.
- Reform systems and rules to foster innovation.
- Provide “one-stop” government services; reform regulations to encourage the utilization of information and communications technology.

Enhancement in Strategic Basic Research Programs

【Strategic Area in Environment Fields】

＜inaugurated in FY2009＞

Strategic Sector: Creation of natural light energy conversion material and utilization basic technology through the fusion of different fields

【CREST】

Research area: Fundamental technologies for the creation and use of materials for solar energy conversion

Research Supervisor: Dr. Masafumi Yamaguchi, Professor, Graduate School of Engineering, Toyota Technological Institute

【PRESTO-Sakigake】

Research area: Photoelectric conversion of sunlight and its functional properties

Research Supervisor: Dr. Shuji Hayase, Professor, Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology

Research area: Artificial photosynthesis and biofunctions for achieving innovative solar energy conversion

Research Supervisor: Dr. Haruo Inoue, Dean, Graduate School of Urban Environmental Sciences, Tokyo Metropolitan University

【CREST】

Research area: Developing an innovative technology and system for sustainable water use

Research Supervisor: Dr. Shinichiro Ohgaki, President, National Institute for Environmental Studies (NIES)

＜Inauguration in FY2008＞

Strategic Sector: Creation of innovative technologies related to reducing global warming in an effort to realize a sustainable society

【CREST】

Research Supervisor: Dr. Itaru Yasui, President, National Institute of Technology and Evaluation; Vice Rector Emeritus United Nations University

Strategic International Cooperative Program (SICP) http://www.jst.go.jp/inter/english/project/purpose.html

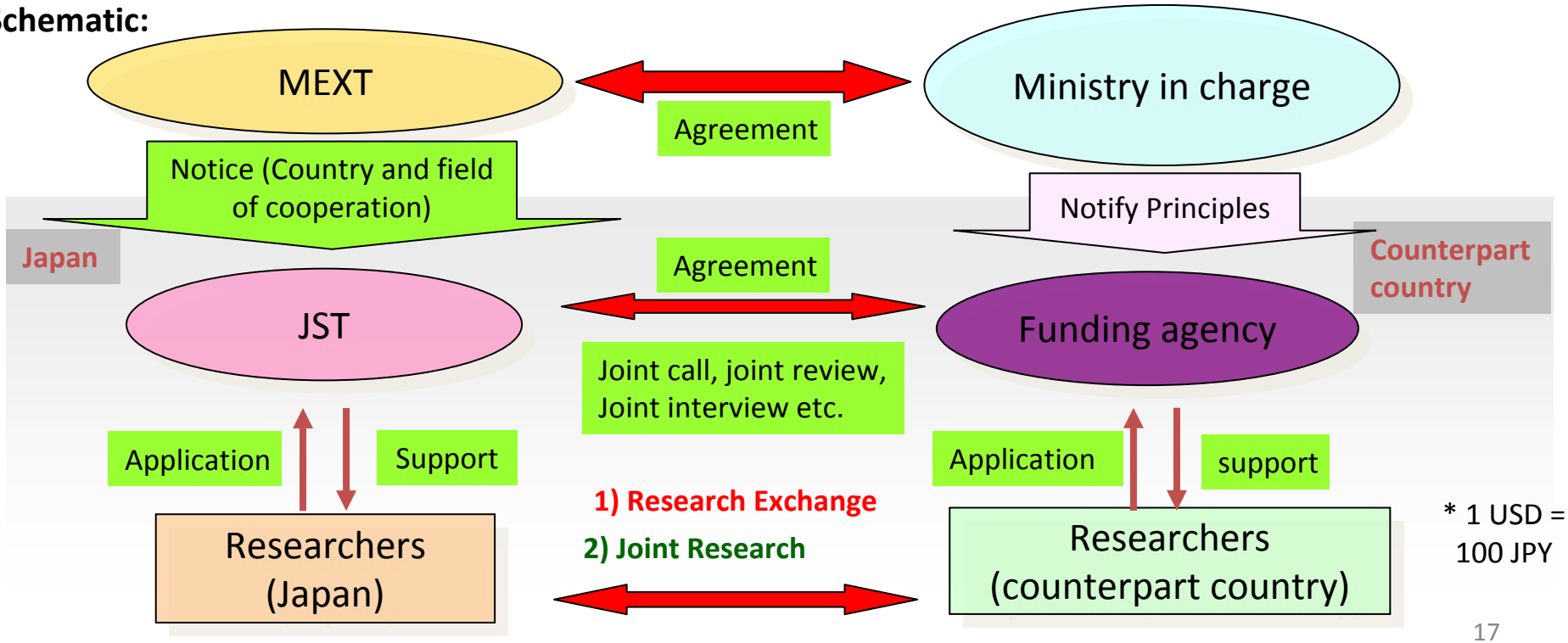
Overview:

- ✓ Based on bilateral agreements at the governmental level
- ✓ MEXT decides countries and research fields of cooperation

(1) Research Exchange Type (since 2003): JST and the counterpart funding agency support collaboration of research projects mainly in the form of exchanging researchers and holding of symposiums and seminars.
Budget for Japanese side: 5 ~ 10 million JPY (50,000 USD ~ 100,000 USD*) / project / year (for 3 years)

(2) Joint Research Type (since 2009): JST and the counterpart agency support the necessary expenses such as research equipments, consumables, travels and publications of joint research projects.
Budget for Japanese side: up to 100 million JPY (up to 1,000,000 USD*) / project / year (for 3 ~ 5 years)

Schematic:



* 1 USD = 100 JPY

Special coordination funds for Green Innovation - 1

Social System Reformation Program to Create New Societies to Respond on Climate Change

Background:

○ "FY2010 Guideline for Allocation of Budget and other Resources on S&T" prioritizes a set of policies for acceleration of R&D and new technology creation for mitigation and adaptation related to global warming as one of the most important policy agenda, and decides to funding them in priority. The policies promotes social system reformation to make use of those R&D results, and through these processes, **"Green Innovation"** will be realized, whose objectives are to streamline industrial and social activities and to improve the public living standards. The effort is expected to establish **"Low Carbon Society,"** which sustains both environmental protection and economic prosperity not only in Japan but all of the world.""

○""FY2010 Budget Request Guideline for Special Coordination Funds for Promoting S&T" decides "the programs are implemented to create innovation through collaboration and coordination between "R&D" and "Social System Reformation", and prioritize its funding on establishment of **"Low Carbon Society"** through **"Green Innovation"** by utilization of technologies for mitigation of global warming and adaptation to climate change"

(Decisions were made by CSTP(Oct., 2009)

Summary

Technologies are developed to **mitigate global warming**, and at the same time, to **adapt to its inevitable influences**. Those developed technologies are **demonstrated in the social systems** . In addition, **social system reformations** are promoted in pioneering social areas (cities and villages) to respond to coming climate change.

Requirement

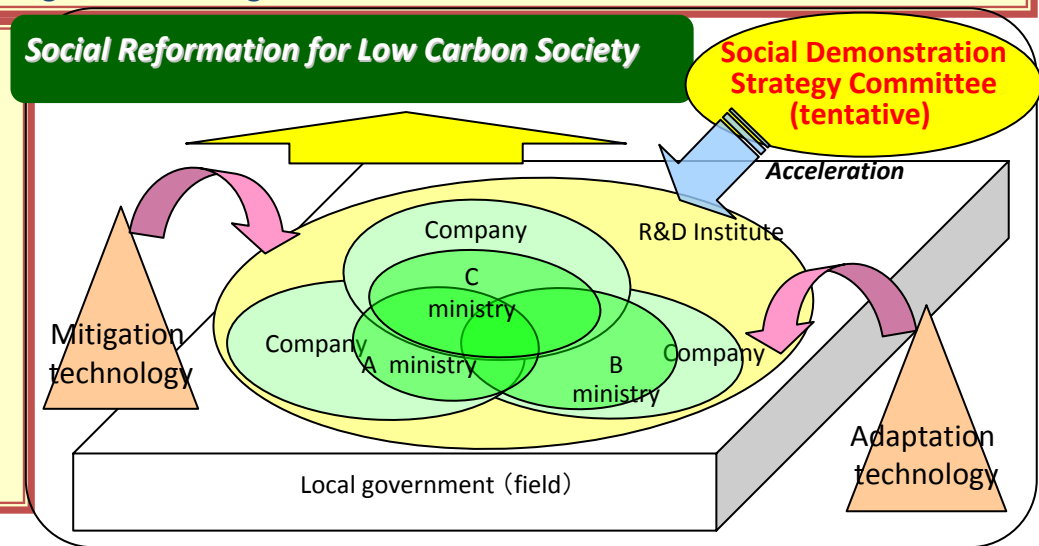
- Cross-ministerial; both technology development responding to climate change and social reformation at the same time

Financial Support

- 100-200 million yen/ project/ year (upper:200million)
- For a period of 5 years (in principle)

Promoters (Participants)

- Technology Development and Social Reformation Promotion Team composed of universities, independent administrative agencies, local governments, private companies, or others



Special coordination funds for Green Innovation - 2

Training of Environmental Leaders

Objectives : The program promotes to foster international environment leaders under the Long-Term Strategic Guidelines, “Innovation 25.” Based its policies as “fostering global environmental leaders,” “university reform” and “strengthening S&T international collaboration,” it establishes centers or systems to foster environment leaders, who will take the leadership to solve the environmental problems in developing countries.

Participants :

universities, inter-university research institutes

（Plural universities can collaboratively apply.

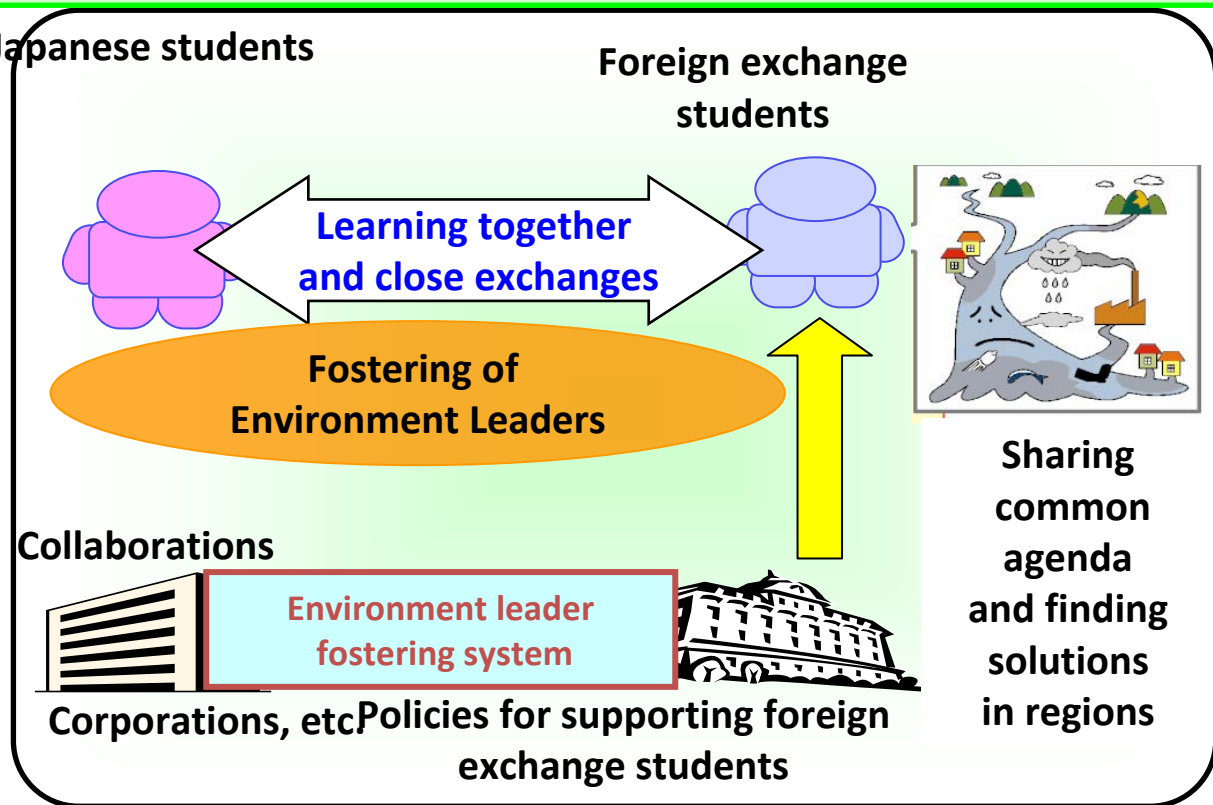
Main participants are expected as universities with a graduate school in environmental sciences.)

Financial Support :

70 million yen/project/year;

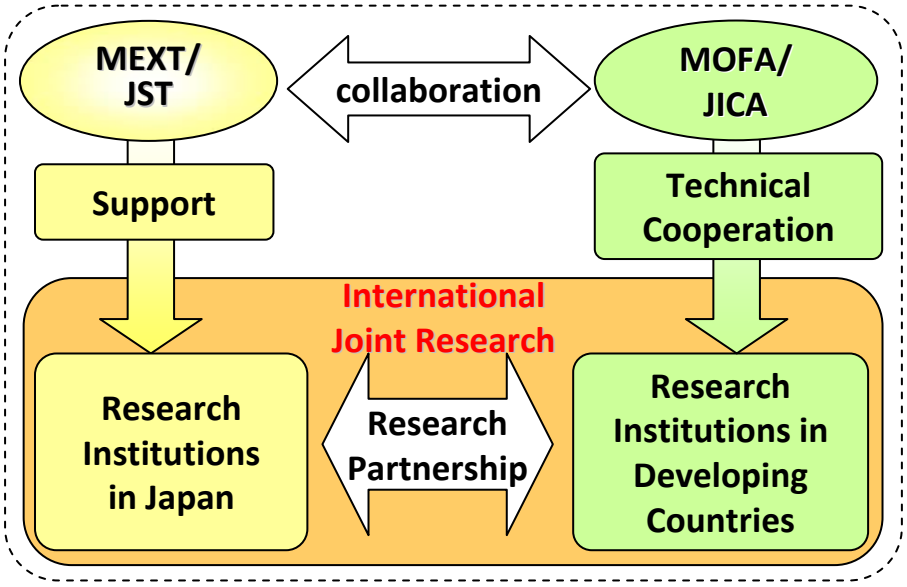
For a period of 5 years

(in principle)



Science and Technology Research Partnership for Sustainable Development （SATREPS)

- JST supports international joint research cooperation between Japan and developing countries for resolving global issues such as: environment/energy, natural disaster prevention and infectious diseases control.
- Such research cooperation is conducted in collaboration with JICA, an organization that implements ODA technical cooperation.
- Objectives of the program are　to strengthen the international science and technology (S&T) cooperation between Japan and developing countries to advance scientific knowledge and technology for resolving the global issues we face, and　to build capacities of counterpart researchers and research institutes.



MEXT: Ministry of Education, Culture, Sports, Science and Technology
MOFA: Ministry of Foreign Affairs
JST: Japan Science and Technology Agency
JICA: Japan International Cooperation Agency

<No. of projects adopted in FY2008 & FY2009>

Research Areas	Region			FY 08	FY 09
	Asia	Africa	Others		
"Research contributing to adaptation to or mitigation of climate change"	16	9	8	4	4
"Research contributing to sustainable utilization of bio-resources"				-	6
"Research contributing to the resolution of global-scale environmental issues"				3	2
"Research on natural disaster prevention measures attuned to the needs of developing countries"				3	5
"Research on measures to address infectious diseases control attuned to the needs of developing countries"				2	4
Total				12	21
				33	

Selected SATREPS Projects for FY2008/FY2009

FY 2008 FY 2009

[India]
◎Research Partnership for the Application of Low Carbon Technology in India
◎ Information Network for Natural Disaster mitigation and Recovery

[Thailand]
○ Integrated Study Project on Hydro-Meteorological Prediction and Adaptation to Climate Change in Thailand (IMPAC-T)
○ R&D for Water Reuse Technology in Tropical Regions
○Research and Development of Therapeutic Products against Infectious Diseases, especially Dengue Virus Infection

[Croatia]
○ Risk Identification and Land-use Planning for Disaster Mitigation of Landslides and Floods in Croatia

[Bhutan]
○ Study on GLOFs (Glacial Lake Outburst Floods) in the Bhutan Himalayas

[Thailand]
◎ Innovation on Production and Automotive Utilization of Bio-fuels from Non-food Biomass

[Viet Nam]
◎ Sustainable Integration of Local Agriculture and Biomass Industries

[Brazil]
◎ Carbon Dynamics of Amazonian Forests
◎ Development of Genetic Engineering Technology of Crops with Stress Tolerance against Degradation of Global Environment
◎ New Diagnostic Approaches in the Management of Fungal Infections in AIDS and Other Immunocompromised Patients

[Egypt]
○ Sustainable Systems for Food and Bio-energy Production with Water-saving Irrigation in the Egyptian Nile Basin

[Philippines]
◎ Project on Integrated Coastal Ecosystem Conservation and Adaptive Management under Local and Global Environmental Impacts in the Philippines
◎ Enhancement of Monitoring Capabilities and Source Process Studies of Earthquakes and Volcanoes in the Philippines
◎ Prevention and Control of Leptospirosis in the Philippines

[Tunisia]
◎ Valorization of Bio-resources in Semi Arid and Arid Land for Regional Development

[Brazil]
○ Research on Ethanol Production from Sugarcane Wastes

[Burkina Faso]
◎ Improving Sustainable Water and Sanitation Systems in Sahel Region in Africa

[Bangladesh]
◎ Research on Disaster Prevention/Mitigation Measures against Floods and Storm Surges

[Ghana]
◎ Studies of Anti-viral and Anti-parasitic Compounds from Selected Ghanaian Medical Plants

[Bolivia]
◎ Study on Impact of Glacial Retreat on Water Resource Availability for Cities of La Paz / El Alto

[Tuvalu]
○ Eco-technological Management of Tuvalu against Sea Level Rise

[Gabon]
○ Conservation of Biodiversity in Tropical Forest through Sustainable Coexistence between Human and wild Animals

[Sudan]
◎Improvement of Food Security in Semi-arid Regions of Sudan through Management of Root Parasitic Weeds

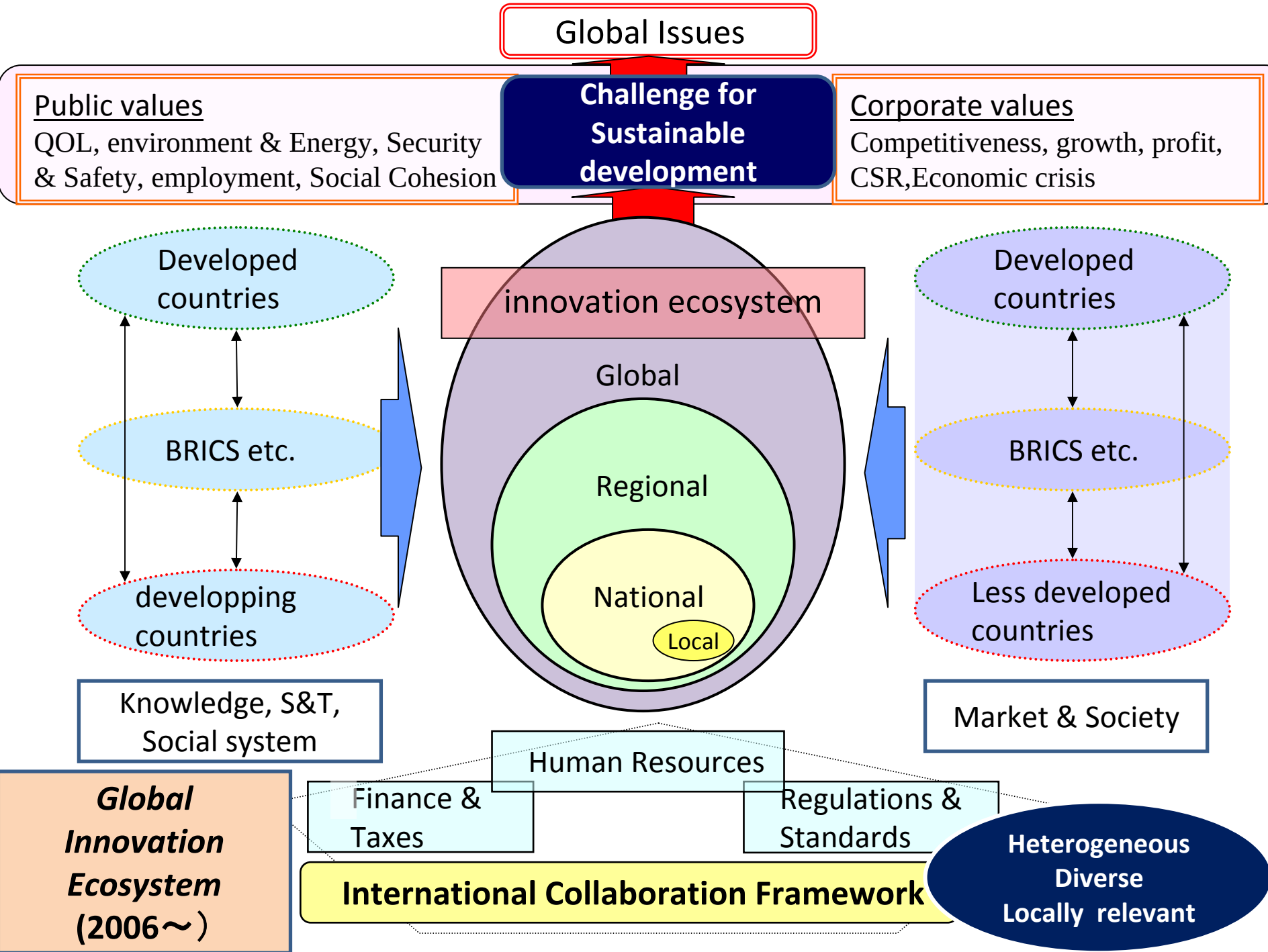
[Peru]
◎ Enhancement of Earthquakes and Tsunami Disaster Mitigation Technology in Peru

[Indonesia]
◎ Climate Variability Study and Societal Application through Indonesia - Japan "Maritime Continent COE"-Rader-Buoy Network Optimization for Rainfall Prediction
◎ Identification of Anti-Hepatitis C Virus (HCV) Substances and Development of HCV and Dengue Vaccines

[South Africa]
◎ Prediction of Climate Variations and its Application in the Southern African Region
◎ Observational Studies in South African Mines to mitigate Seismic Risks

[Zambia]
○ Establishment of Novel Diagnostics Tools for Tuberculosis and Trypanosomiasis and Screening of Candidate Compounds for Trypanosomiasis in Zambia

[Indonesia]
○Wild Fire and Carbon Management in Peat-forest in Indonesia
○ Multi-disciplinary Hazard Reduction from Earthquakes and Volcanoes in Indonesia


Global Issues
Challenge for Sustainable development
Public values
QOL, environment & Energy, Security & Safety, employment, Social Cohesion
Corporate values
Competitiveness, growth, profit, CSR,Economic crisis
Developed countries
BRICS etc.
developping countries
innovation ecosystem
Global
Regional
National
Local
Developed countries
BRICS etc.
Less developed countries
Knowledge, S&T, Social system
Market & Society
Human Resources
Finance & Taxes
Regulations & Standards
International Collaboration Framework
Heterogeneous
Diverse
Locally relevant
Global Innovation Ecosystem (2006～)